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SIGNAL INTELLIGENCE DIVISION
OFFICE OF CHIEF SIGNAL OFFICER
HQ. AFOSMA, A.P.O. 887

SUBJECT: Multichannel Intercept Teletype (MIFS)

4 July 1945

MEMORANDUM TO: Col. George A. Eicher

1. This report is to be considered a preliminary evaluation of the German equipment for the interception of Russian Multichannel Teletype circuits, called "MIFS" (Hartmehrfachfarnschreiber-Multichannel Intercept Teletype).

2. The background story of the recovery of this equipment is given in the report of TICOM Team #1 dated 16 June 1945, Appendix 14, and the technical background causing the development of this equipment is given in a German document published in TICOM report D-1A. The technical analysis of this equipment itself will be prepared by the following group working on this device:

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|--------------|----------|-------------------|----------|
| Lt. Ruth | U.S.A. | Lt. Gaschk | U.S.N. |
| Lt. Holmes | U.S.A. | Mr. Kennersworthy | Br. Civ. |
| Capt. Carter | Br. I.C. | Mr. Mason | Br. Civ. |
| Lt. Phillips | U.S.N. | | |

3. This equipment was developed for the interception of the Russian 2, 6, or 9 channel radio teletype links which carry traffic between such places as Moscow to Leningrad, Tostock, Army Groups, and from Army Groups to Armies. The Russian signal is similar to standard carrier shift teletype circuits except that this shift is of 5000 cycles, which indicates two separate crystal oscillators. To increase the traffic carrying capacity, the teletype start stop pulse has been deleted and each individual pulse shortened to 10 milliseconds. To maintain synchronization a radio sync pulse is sent before each group of characters. This whole system is similar to Multiplex operation and like Multiplex each individual channel cannot operate at maximum speed but rather at one-half or one-third maximum speed. The radio circuits are operated on Medium and High frequencies.

4. The main components of the intercept machine are as follows:

- a. A normal intercept receiver which feeds into the "MIFS" set.
- b. An Automatic Volume Control and rectifier unit, to change the voice frequency current to direct current.
- c. A mechanical distributor, which has the function of separating the incoming pulses into their proper channels. This distributor has changeable faces to handle the 2, 6, or 9 channel signals. The incoming sync pulse is not used to control the distributor speed, as this speed is manually adjusted, but is fed to a cathode ray tube which then gives a

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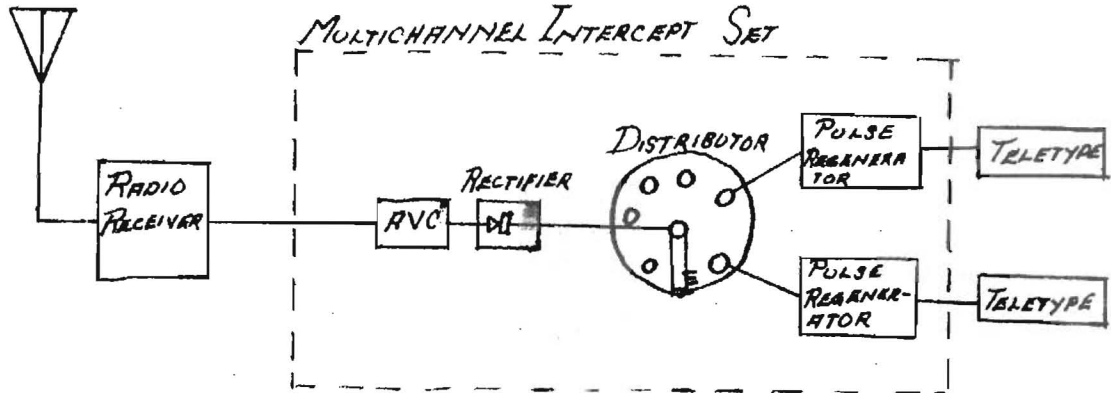
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Deputy Associate Director for Policy and Records
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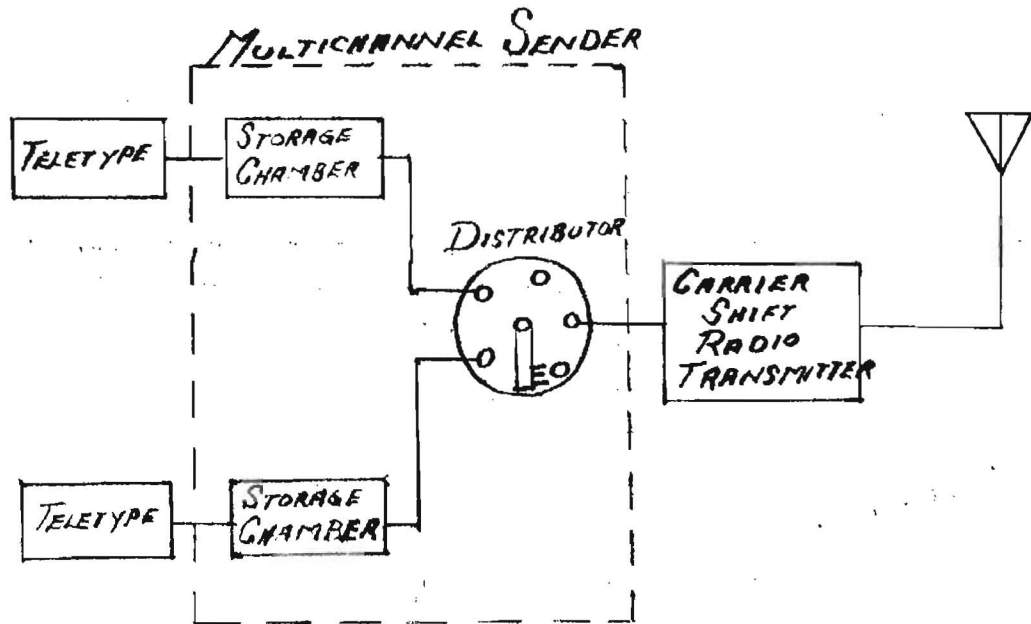
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visual indication of the degree of synchronization as well as the phase error of the local set.

d. From the distributor each separated channel goes to the final stage. This final stage can be termed a pulse regenerator as it inserts the necessary start-stop signal and lengthens each pulse to the standard 20 millisecond length. It should be noted that the teletype code used is not the standard teletype code but rather the "Baudot" teletype code. A block diagram of this set is given below:



5. The operation of the transmitting equipment can be approximated by the following block diagram:



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6. The transmitters for the rear area sets operate at 20 KW, while the Army to Army Group sets are of 1 to 2 KW capacity. All signals observed are very powerful and give perfect copy.

7. The organization that operated this intercept equipment was of platoon size and was attached directly to OKH headquarters. This unit was part of "Gruppe IV under the General der Nachrichtenaufklärung" and was one of four units in the field. At least one of these units monitored the U.S. Multichannels, and another the U.S. carrier shift links (the A.T.C. net and the Multichannel standby). Although they knew of the existence of telephone and facsimile transmission on the multichannel, there is nothing to indicate that they did any work on this phone channel other than recording it. This intercept set was called the H-WT-FF (H-WT-Funkfernsehreiber-A.C. Radio Intercept Teletype).

8. Were our forces to attempt to intercept these signals, this material represents a saving of six to nine months work. The sets themselves represent a construction time of approximately four months were their duplication attempted. The present equipment is sufficient to spot check the 10 to 15 Western circuits, but cannot do one hundred percent coverage of all circuits. At the present traffic levels this equipment will intercept 100,000 groups daily, which should be sufficient for preliminary analysis. Because of the limited Russian communication facilities available, it is certain that 3 or 4 of these circuits also exist to the Far Eastern Frontier.

9. The traffic intercepted is mainly enciphered, part in One Time Pad and part in a medium grade system. The German cryptanalysts state that the medium grade system readily yields a solution while the One Time Pad messages are used only for traffic analysis. In general the Russian cryptographic and communication security is very poor, in fact, incredibly poor.

10. The technical design of this equipment is excellent, but if these sets were to be duplicated it might be wise to replace the present speed control and mechanical distributor mechanism by electronic circuits. Such a circuit would be of the gate circuit type and would be triggered by the radio sync pulse. The development of such a circuit would be very technical but would save on construction time. Also the use of two receivers, one on the main carrier and the other on the shifted carrier, would permit reception under adverse conditions.

11. Of special interest in TICOM report D-1A is the Germain Antennae Amplifier which permits the operation of 40 intercept receivers from the same antennae without mutual interference and then an increased signal to noise ratio. Such a device could well be used by our own services.

HOWARD C. BARLOW
Major, Sig C.

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